Small Business Economic Impact Statement
for
New Proposed Forest Practices Rules
Implementing the Forests and Fish Report

Final Report

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EXECUTIVE SUMMARY

The Forest Practices Board (FPB) and the Department of Ecology (DOE) are considering making changes to permanent forest practices rules. Since the proposed permanent rule changes will impose more than minor costs on forest products businesses, a Small Business Economic Impact Statement (SBEIS) is required (RCW 19.85.030). This study analyzes the effects of the new proposed rule compliance costs on small and large businesses.

The rule complying community is all forest businesses in the State of Washington. Forest businesses are businesses that own or control cutting rights on forestlands and include, but are not limited to, landowners, loggers and mill owners. Small forest businesses are those businesses with 50 or fewer employees.

Compliance cost is defined as a loss in current revenue, a loss in asset and higher operating costs. The basis for comparing costs between large and small businesses is the cost per one hundred dollars of sales. In western Washington, the cost of implementing the proposed rules falls more heavily to small businesses compared to large businesses. The compliance cost is 25.6% for small businesses and 18.5% for large businesses. These percentages represent the value of compliance cost relative to the total business value, i.e. their timber asset value. In eastern Washington, small businesses will lose 31.0% of their business value by implementing the rules compared to 22.1% for large businesses.

In western Washington the greatest cost associated with adopting the proposed rule is realized in the form of foregone sales associated with establishing Riparian Management Zones (RMZ). This cost is estimated to be 19.1% of the total business value for small businesses and 11.1% for large businesses. Road maintenance and stream crossings could add an additional cost of 6.9% and 5.5% of total business value for large and small businesses, respectively. RMZ setup costs comprise a smaller percentage of the new proposed rule compliance cost. The RMZ setup costs are 0.5% and 1.0% of total value for large and small businesses respectively.

The major component of compliance cost in eastern Washington is associated with road maintenance and stream crossings. For large businesses, this cost comprises more than three-quarters of the total compliance cost of 22.1%. For small businesses, road maintenance and stream crossings comprise nearly half of the total compliance cost of 31.0%. Small businesses also incur a substantial cost in the form of foregone sales to establish the RMZ. Twelve percent of the total business value for small businesses is compliance cost related to RMZ versus 4.2% for large businesses. RMZ setup costs are also three times as much for small businesses than large businesses.

In addition to the compliance cost, lost employment resulting from lower timber harvests suggests that there are substantial wage losses and potentially large disproportional impacts on small businesses. The losses amount to nearly $16 million in eastern Washington for the forestry and saw-milling sectors (assumed to mostly impact small businesses) and nearly $7 million for the pulp and paper sectors (assumed to mostly impact large businesses). In western Washington, the losses are over $160 million in the saw-milling and forestry sectors (again assumed to be mostly small businesses) and $123 million in the pulp and paper sectors.

A compensation program would pay an estimated $0.68 on average to western Washington small landowners for every $1.00 of lost sales resulting from the new RMZ. The total compensation package for the small businesses that were sampled for this evaluation would total $3.9 million compared to $5.7 million in lost sales associated with the RMZ. The compensation for eastern Washington is $0.50 on average for small landowners for every $1.00 of lost sales resulting from the new RMZ. The total compensation for the businesses sampled totals $233,000 compared to $467,000 in lost sales. The difference in compensation between eastern and western Washington is due to the higher proportion of compliance cost associated with road maintenance and stream crossing in eastern Washington.

In addition, the FPB and the Washington State Legislature have taken other steps to reduce the cost of the proposed new forest practices rules on small businesses. They include delaying compliance timetables for road maintenance and abandonment plans required by the new rules for small landowners. Also, small landowners who own less than 80 acres statewide (with a forest practices application on less than 20 acres) are not required to follow the new proposed forest practices rules for riparian protection. They are however, subject to the permanent riparian management zone rules and watershed analysis prescriptions in effect as of January 1, 1999. They must also allow for an additional 15% volume requirement where watershed analysis prescriptions are not in effect. These landowners will be allowed to harvest more timber than larger landowners under the new rules.

The mitigation for these small landowners is substantial. In western Washington it reduces potential foregone sales from $1.1 million to $147,000. In eastern Washington the compliance cost is reduced by $800,000 (the estimated value of lost sales) among those small landowners sampled for this study.

Small landowners with timber harvests of less the 2 million board feet receive a 16% tax credit on taxes imposed under RCW 84.33.074 for complying with the new proposed forest practices rules. The harvesters will pay a lower timber tax for timber harvested in compliance with the new proposed rules.

The Department of Natural Resources (DNR) also established a small forest landowner office to be a resource and focal point for small forest landowner concerns.

Other mitigation measures listed in the new proposed forest practices rules that are available to all landowners include: alternate plans, multi-year permits, and Habitat Conservation Plan (HCP) exemptions. Alternate plans allow a landowner to develop an alternate method of protecting public resources that might better fit their particular situation, yet still provide an equal or greater level of protection for public resources. Those landowners that have unusual constraints that make it difficult to comply with the forest practices rules have the option to propose an alternate plan. Multi-year permits allow a landowner in a watershed analysis unit to instigate multiple forest practice actions for up to 5 years as opposed to the standard 2-year permit. Landowners with an approved HCP that provides for species protection under the forest practices rules are not subject to forest practices rules.

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The Small Business Economic Impact Statement for New Proposed New Forest Practices Rules

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INTRODUCTION

The Forest Practices Board (FPB) and the Department of Ecology (DOE) are considering making changes to the permanent forest practices rules. The goals for the proposed changes are:

1. to provide compliance with the Endangered Species Act for aquatic and riparian-dependent species on non-federal forest lands.,
2. to restore and maintain riparian habitat on non-federal forest lands to support harvestable supply of fish,
3. to meet the requirements of the Clean Water Act for water quality on non-federal forest lands,
4. to keep the timber industry in the State of Washington economically viable..

Since the proposed permanent rule changes will impose more than minor costs on forest products businesses, a Small Business Economic Impact Statement (SBEIS) is required (RCW 19.85.030). This study analyzes the effects of the new proposed rule compliance costs on small and large businesses.

STUDY OBJECTIVE

The objective is to determine whether the compliance cost exhibits a disproportionate impact on the state's small businesses. The legislative purpose of the Regulatory Fairness Act RCW 19.85 (RFA) is set out in RCW 19.85.011:

> "The legislature finds that administrative rules adopted by state agencies can have a disproportionate impact on the state's small businesses because of the size of those businesses. This disproportionate impact reduces competition, innovation, employment, and new employment opportunities, and threatens the very existence of some small businesses. The legislature therefore enacts the Regulatory Fairness Act with the intent of reducing the disproportionate impact of state administrative rules on small business".

The specific purpose for the SBEIS is contained in RCW 19.85.040.

> "(1) A small business economic impact statement must include a brief description of the reporting, record keeping, and other compliance requirements of the proposed rule, and the kinds of professional services that a small business is likely to need in order to comply with such requirements. It shall analyze the costs of

compliance for businesses required to comply with the proposed rule adopted pursuant to RCW 34.05.320, including costs of equipment, supplies, labor, and increased administrative costs. It shall consider, based on input received, whether compliance with the rule will cause businesses to lose sales or revenue. To determine whether the proposed rule will have a disproportionate impact on small businesses, the impact statement must compare the costs of compliance for small businesses with the cost of compliance for the ten percent of businesses that are the largest businesses required to comply with the proposed rules using one or more of the following as a basis for comparing costs:
(a) Cost per employee;
(b) Cost per hour of labor; or
(c) Cost per one hundred dollars of sales.
(2) A small business economic impact statement must also include:
(a) A statement of the steps taken by the agency to reduce the costs of the rule on small businesses as required by RCW 19.85.030(3), or reasonable justification for not doing so, addressing the options listed in RCW 19.85.030(3).
(b) A description of how the agency will involve small businesses in the development of the rule; and
(c) A list of industries that will be required to comply with the rule. However, this subsection (2)(c) shall not be construed to preclude application of the rule to any business or industry to which it would otherwise apply."

Background information on the Forests and Fish Report is presented in the next section. Section 3 provides a description of the requirements for an SBEIS. This section is followed by the method of analysis, data and data analysis. Results are presented next, followed by employment costs and a final section, which provides mitigation measures undertaken.

BACKGROUND INFORMATION AND NEW PROPOSED RULE CHANGES

The Forests and Fish Report

In November 1997, in anticipation of the listing of several subspecies of Washington salmon as threatened or endangered, participants in Timber, Fish, and Wildlife (TFW) began negotiating a proposal for new forest practices rules. The goal of this proposal was to protect and restore riparian habitat on non-federal forestlands in compliance with the Endangered Species Act and the Clean Water Act, while maintaining the economic viability of Washington's timber industry. Participants in the TFW process included six caucuses: federal agencies, state agencies, Indian tribes, counties, environmentalists, and the timber industry. The environmentalists withdrew from the debate in September 1998, but the remaining participants agreed to a conceptual proposal for new forest practice rules to protect salmon habitat on non-federal forestlands in Washington. The process became known as the "Forest and Fish" negotiations and the

stakeholders' recommendations became known as the "Forests and Fish Report," which is the foundation for the forestry module portion of the Washington State salmon recovery plan.

Proposed Rules

In the spring of 1999, legislation based on the Forests and Fish Report was passed by the Washington State Legislature and signed into law by Governor Gary Locke.[1] The legislation requires the FPB, which is responsible for establishing forest practices rules, to adopt a set of emergency rules that are consistent with the recommendations of the Forests and Fish Report. Following that, permanent rules are to be adopted by the board. For the permanent rules the board is not required to follow the recommendations of the Forests and Fish Report, but it is "strongly encouraged" to by the legislation.

The FPB proposed emergency rules in October 1999, and after a public hearing in November the rules were finalized and adopted by the board on January 20, 2000. The emergency rules became effective on March 20, 2000. Additions to the emergency rules were adopted May 10, 2000, and became effective July 3, 2000. These emergency rules will remain in effect until June 30, 2001, or until the permanent rules are adopted, whichever is sooner.

Summary of New Proposed Rules

The new proposed rules introduce changes to forest practices that will impose a cost to forest practice applicants. While there are many aspects of the new proposed rules that change the way applications for forest practices are approved, the major aspects of these changes are the focus of this study. They include the changes to forest practices that affect timber harvests, access to the timber through road construction and maintenance and administrative setup costs associated with the new rule changes. Other aspects such as procedures for unstable slopes, multi-year permits, adaptive management and watershed analysis are assumed to comprise a significantly smaller compliance cost and/or there is no information at the time of the study to allow any cost estimate to be determined.

The new proposed rules address:

(i) water typing rules,
(ii) riparian habitat management,
(iii) unstable slopes,
(iv) forest roads,
(v) wetlands,
(vi) watershed analysis,
(vii) adaptive management,
(viii) forest pesticides, and
(ix) cultural resources.

Of these nine topics, riparian habitat management and forest roads make up the greatest portion of the compliance cost associated with the new proposed rules. Unstable slopes may be a third

[1] The 1999 Salmon Recovery Act, 1999 Laws, 1st Special Session, Chapter 4.

major component of the compliance cost, but their analysis is difficult because there is no statewide identification of unstable slopes, which precludes any statistical analysis of their compliance cost. The following paragraphs present each topic briefly with a description of how it may impact compliance cost.

Water typing under the proposed rules classifies waters of the state into three types. Type S waters are all waters inventoried as "shorelines of the state". Type F waters are waters not classified as Type S, which contain fish habitat. Type N waters are waters not classified as Type S or F, which are either perennial streams or intermittent (seasonal). Water typing does not directly affect the compliance cost of businesses. Water typing indirectly impacts businesses through riparian habitat management and the establishment of riparian buffers.

Riparian habitat management includes separate requirements for western and eastern Washington.[2] Riparian Management Zones (RMZ) are identified according to state location, stream type, site class of adjacent land, management harvest options and stream size.

Western Washington RMZ requirements:

For fish-bearing streams (Type S and F waters), a three-zone buffer is required. The buffer is measured horizontally from the bankfull width or the channel migration zone (CMZ), whichever is greater, and the total width must extend out to the site potential tree height (SPTH). The SPTH is the potential height of the dominant conifer measured at 100 years, which varies by site class. The three zones are as follows (see Figure 1).

1. *Core zone*. A 50 feet buffer in width where no timber harvest is allowed.

2. *Inner zone*. A buffer zone immediately outside the core zone from 10 to 100 feet, the width of which varies with stream size, site class, and management options. Thinning is allowed in this zone only if minimum basal area requirements are met. Stand requirements vary by site class and consider the desired future condition target basal area per acre. When the conditions are not met, no harvesting is permitted in the inner zone. If harvesting is permitting due to surplus basal area consistent with the stand requirement, one of two options can be considered: thinning from below or leaving trees closest to the water.

When the required stand basal area cannot be met within the sum of the areas in the inner and core zones due to the presence of a stream-adjacent parallel road in the inner or core zone, a determination must be made of the approximate basal area that would have been present in the inner and core zones if the road was not occupying space in the core or inner zone and the shortfall in the basal area component of the stand requirement.

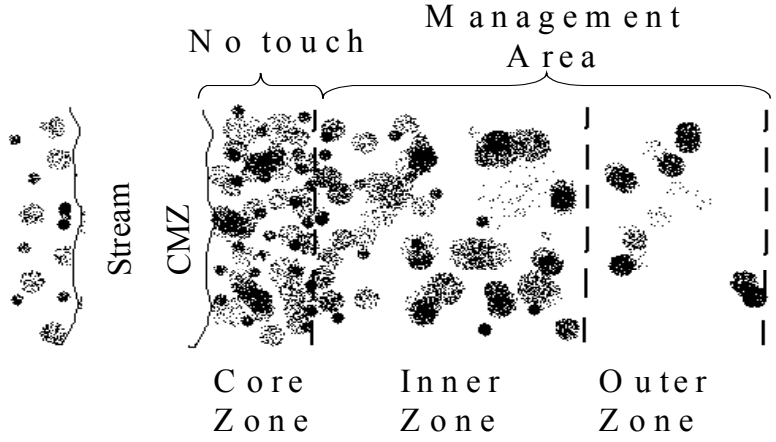
[2] Eastern Washington is defined as the area east of the crest of the Cascade Mountains from the international border to the top of Mt. Adams, then east of the ridge line dividing the White Salmon River drainage from the Lewis River drainage and east of the ridge line dividing the Little White Salmon River drainage from the Wind River drainage to the Washington-Oregon state line.

3. *Outer zone*. This zone extends from the outer edge of the inner zone out to full SPTH. Harvest is permitted in this zone, but 20 riparian leave trees per acre must be left. This number may be reduced under specific circumstances described in the Forest and Fish report.

For non-fish bearing perennial streams (Type N waters), a non-contiguous 50-foot no-touch buffer is required for at least 50% of the total length of the stream (see Figure 2). The buffer must include the first 300-500 feet (depending on the length of the stream) above the confluence of a fish-bearing stream, and it must also include sensitive sites such as seeps or springs. In addition, there is a 30-foot equipment limitation zone along the entire length of the stream. Mitigation is required if forest practices disturb more than 10% of the equipment limitation zone.

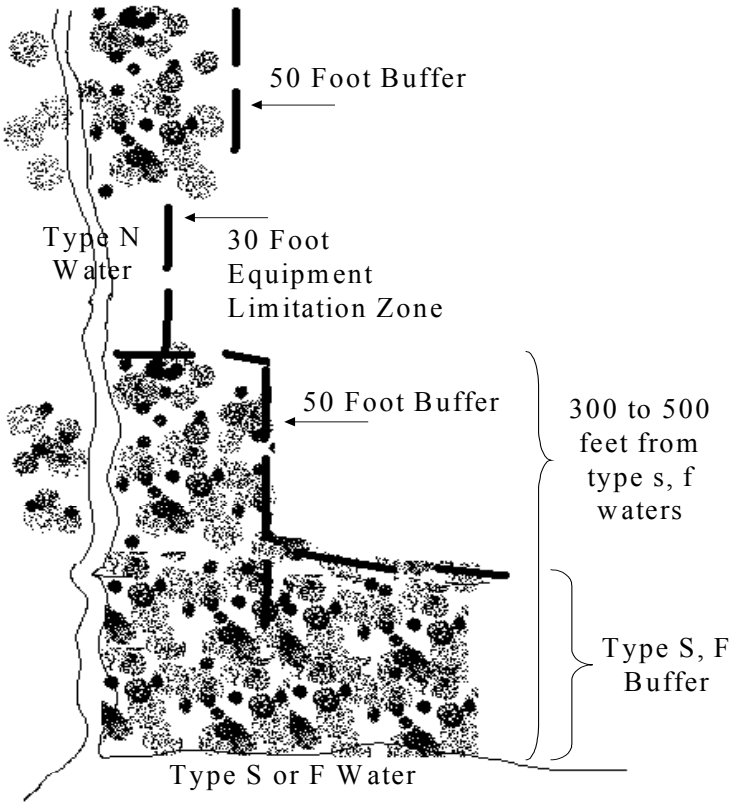
For non-fish bearing seasonal streams (type N waters), there is a 30-foot equipment limitation zone. "Seasonal stream" means streams that are not perennial but are physically connected by a defined channel system to downstream waters so that water or sediment initially delivered to these waters may eventually be delivered to a type S or F Water. Harvesting may occur and mitigation is required if forest practices disturb more than 10% of the equipment limitation zone.

Current rules have RMZ up to 100 feet depending on the water type, stream width and the bed material for Water Types 1, 2, and 3. RMZ are not required for Type 4 and 5 waters.



The Core Zone is 50 feet wide. The Inner Zone, which allows forest management when certain conditions are met, is of variable length for Type S and F waters and can range from 10 to 100 feet wide. The Outer Zone has a 20 tree riparian leave tree condition and can vary from 22 to 67 feet wide.

Figure 1. RMZ for Type S and F waters, western Washington



For Type N perennial waters a non-contiguous buffer of 50 feet is required for at least 50% of the total length of the stream and must include the first 300 to 500 feet above the confluence of a fish-bearing stream. For perennial and seasonal streams there is a 30 feet equipment limitation zone.

Figure 2. RMZ for type N streams, western Washington

Eastern Washington RMZ requirements:

For fish-bearing streams (type S and F waters), a three-zone buffer is required as follows (see Figure 3):

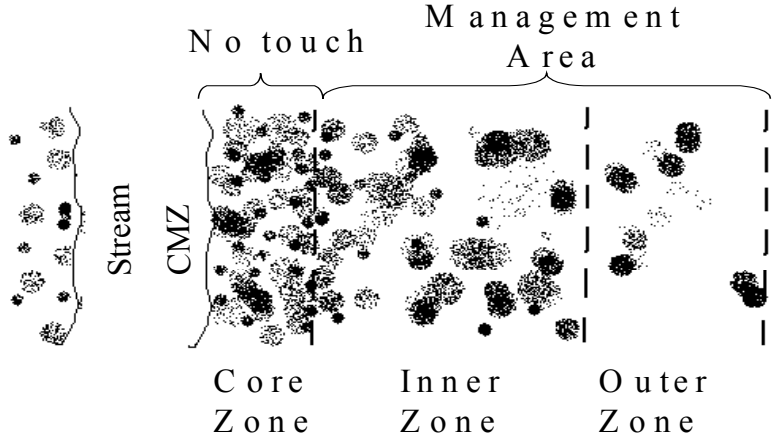
1. *Core zone*. This is a 30 feet wide buffer extending from the bankfull width or CMZ whichever is larger on both sides of the stream for all timber habitat types. No timber harvest is allowed in this zone.

2. *Inner zone*. This is an area of limited harvest that is measured from the outer edge of the core zone and extends 45 feet for streams less than or equal to 15 feet wide and 70 feet for streams greater than 15 feet wide. Harvest is allowed in this zone when specific basal area requirements are met. These requirements vary based on the timber habitat type.

3. *Outer zone*. Measured from the outer edge of the inner zone, the width of this zone ranges from 0 to 55 feet, depending on the site class and the width of the stream. Harvest is permitted in this zone, but a certain number of leave trees must be left depending on the timber habitat type.

For non-fish bearing streams (type N waters), there is a 30-foot equipment limitation zone on either side of the stream. Mitigation is required if forest practices disturb more than 10% of this zone. In addition, for perennial type N water harvest is limited within 50 feet of the bankfull width of the stream. Within this zone, landowners must choose a clear-cut or partial cut strategy, each of which is subject to certain restrictions.

Current rules require RMZ up to 300 feet for even-aged harvests and 50 feet for partial cutting harvests. The number of trees per acre required depends on the soil type. RMZ are not required along Type 4 and 5 waters.



The Core Zone width is 30 feet. The Inner Zone, which allows forest management when certain conditions are met, is of variable length for Type S and F waters and can range from 45 to 70 feet wide. The Outer Zone has a width of 0 to 55 feet with a 10 to 15 tree riparian leave tree condition.

Figure 3. RMZ for Type S and F waters, eastern Washington

RMZ for Exempt 20-acre Parcels: On parcels of 20 contiguous acres or less, landowners with total parcel ownership of less than 80 forested acres are not required to leave the riparian buffers described above. These landowners are subject to the permanent riparian management zone rules and watershed analysis prescriptions in effect as of January 1, 1999, plus an additional 15% volume.

Unstable Slopes are specifically defined by slope gradient and geomorphic features. If, upon the application of the forest practices rules, unstable slopes are found, the landowner must submit a geo-technical evaluation prepared by a qualified expert of the unstable slopes. There is the potential for substantial compliance cost associated with unstable slopes, however, data to analyze the effect of unstable slopes is lacking at the time of this study.

***Forest Roads and Wetlands**:* Changes to forest road management, design and construction have been made under the new proposed rules. Improved standards will be applied on Type N streams. Culverts must be designed or replaced to pass a 100-year flood rather than a 50-year flood. Ditch relief culverts must be spaced more closely. There is required erosion control for new roads where a potential for soil to enter a stream exists. Also road maintenance and abandonment plans will be required for all landowners. Landowners who own less than 500 hundred acres of land will have to submit a plan for their ownership with its first forest practices application. Those with more than 500 hundred acres of land must submit road plans for 20% of their lands each year for the next five years.

Under current rules road maintenance and abandonment plans are required based on watershed analysis prescriptions or Department of Natural Resources (DNR) request.

Increased protection of wetlands will be through refinements in wetland mapping as well as assessment of forested wetland functions. Landowners will be required to map all forested wetlands that are three or more acres in size.

Watershed Analysis will continue to be voluntary for landowners and mandatory for DNR.

***Adaptive Management**:* Consideration will be made by the FPB regarding the requirements and definition of an adaptive management process.

***Forest Pesticides**:* The new proposed rule changes apply a zero-drift and zero entry of aerially-applied forest pesticides into water policy. No data is analyzed to determine the compliance cost of forest pesticides. However, the compliance cost associated with this practice is not considered significant relative to other costs.

Cultural Resources protection under current rules will still be in place. Incidental protection provided to cultural resources in riparian habitats and wetlands will be increased in proportion to the increase in the amount of area protected under the new proposed rule changes.

REQUIREMENTS FOR AN SBEIS

Regulatory Fairness Act

The present analysis is in response to the RFA (RCW 19.85), which requires that a SBEIS be prepared for proposed rules that will impose more than minor costs on businesses in an industry. To comply with the RFA the study identifies potentially affected industries, defines small and large businesses and determines the compliance cost for these businesses. The study analyzes the compliance cost of the proposed rules and compares the cost of compliance for small businesses with the cost of compliance for large businesses.

If there is a disproportionate economic impact on small businesses in comparison with large businesses, the RFA requires that the cost imposed by the rule on small businesses be reduced where legal and feasible in meeting the objective of the statutes upon which the rule is based. If steps are not taken to reduce the costs on small businesses, the agency must provide reasonable justification for not doing so.

The DNR has identified a sample of affected businesses to determine the compliance cost of small and large businesses. The Department has also appointed a steering committee to assist in the accurate assessment of the costs of a proposed rule (RCW 19.85.030, 040).

Potentially Affected Industries

Businesses that own or control the cutting rights on forestland are the rule complying community. Aside from the landowner, the potentially affected industry includes loggers, mill owners and others holding timber cutting rights. Hence the complying community is defined broadly as those with the right to dispose of the timber. Even though forest landowners may have other aspects to their business such as agriculture, manufacturing, or other land-based businesses and may by classified as a different type of business than forest based, they comprise the potentially affected industries in this study. The study uses the term "forest business" to define this rule complying community in the study.

Small Businesses Versus Large Businesses

The RFA defines a "small business" as one with 50 or fewer employees. We apply this definition in our study using the business identification number associated with a land parcel to determine the number of employees associated with that business.

Compliance Cost for Businesses

Given the requirements to increase the riparian buffer requirements, forest businesses would incur a cost to comply with the rules when they decide to harvest their timber or sell their land assets. Such a cost results in a loss in current revenue, a loss in asset, and higher operating costs. The loss in asset reflects a loss in future timber revenue. In addition, these costs might trigger some other financial difficulties for small business owners and expose them to higher

business risks. Even if the land is currently used for recreation or other non-timber uses, the business opportunities for the assets can be reduced due to the regulatory constraints.

Since forest-related assets have a long management cycle, the regulatory impacts will take place over a long period. The present value of compliance cost is used as an indicator of the regulatory impact. In other words, the regulatory impact is the difference between today's market value of a land asset with the proposed rules and today's market value without the new regulation in place.

In addition to the increased buffer requirements and their associated costs, forest businesses are also required to implement changes to forest road management, design and construction. The improved standards and the preparation of road maintenance and abandonment plans represent an additional cost for forest businesses to comply with the new proposed rule. As mentioned above, such a cost results in a loss in asset as well as higher operating costs. The present value of the cost of preparing and implementing new road standards is used as an estimate of the cost of compliance associated with changes to forest road management, design and construction under the new proposed rules.

Additional effort on the part of forest businesses is required to meet the requirements of the new proposed rules. Such efforts include, but are not limited to, hiring professionals to implement and gather the necessary information to submit a forest practice application. A successful forest practices application will require added cost to set up and implement a harvest. These additional activities will result in higher operating costs for forest businesses, which is included in the calculation of compliance cost.

Involvement of Concerned Stakeholders

The RFA requires the SBEIS to include a description of how the agency will involve small businesses in the development of the rule. While Forest and Fish negotiations were not held in a public forum, key stakeholders groups did participate in the process, which resulted in a conceptual rule proposal. Also, the FPB has received regular status reports at its public meeting, which include opportunities for public comment.[3]

In addition, a Steering Committee comprised of general public members from various stakeholder groups was formed to act as advisors and reviewers for the SBEIS. A presentation of work-in-progress on the SBEIS was made to the Steering Committee during April and October 2000**.**

[3] November 12, 1997, February 11, 1998, April 2, 1998, May 13, 1998, and August 12, 1998, Jan 29, 1999, Feb 10, 1999, Mar 31, 1999, June 17, 1999, July 21, 1999, Aug 10-11, 1999, Sept 29, 1999, Nov 16, 1999, Jan 20, 1999, Mar22, 1999, May 10, 1999. Some meetings were broadcast statewide on TV Washington.

METHODS OF ANALYSIS

The study uses the cost per one hundred dollars of sales to estimate the effect of the rule changes and the payments under the Salmon Recovery Act (ESBH 2091)[4] on forest businesses. The foregone present value of timber sales is calculated by multiplying the acres in RMZ for each timber type by the average value for recent timber sales by each county. Data on the number of acres affected under the new proposed rule changes, the value of timber sales per acre by county and the timber type by vegetation and age are used to calculate the foregone present value of timber sales.

The effect of the rule changes is reported as a *net effect*. The net effect is determined by subtracting the acres in stream buffers under rules existing prior to the current emergency rules from acres proposed for RMZ under the new proposed rule changes. Economically inaccessible acres are added to the net changes associated with the new proposed rule changes to determine the effect of the new proposed rule changes.

The parcel's timber value is determined using data on the average value per acre for the last three years of timber sales from each county. The present value for pole timber is determined using a 5.8% discount rate and 30 year maturity date. The present value calculation for recently cut areas (reproduction acres) uses a 5.8% discount rate and 50-year maturity date. In the RMZ, the present value for recently cut areas represents a sunk cost of recent planting expenditures that is carried forward with the intention of harvesting mature timber at rotation age. In addition to the foregone timber sale value, we calculate a bare land value for all acres by multiplying acres by an average, regional bare land value.

For timberland owners who fall under the 20 acres exemption rule, we calculate 15% of the volume of timber under current forest practice rules and multiply it by the county average value for recent timber sales.

The effect of rule changes on forest businesses in the lumber dependent economy is measured as the change in output, price and employment. The changes are calculated using the estimated timber volume in RMZ that is no longer available for harvest. The volume is determined by multiplying the net area in RMZ by average volume per acre for each vegetation type. The calculated timber volume is converted to lost employment using an employee per thousand board foot multiplier.

The effect of compensation payments is determined using the established formula for small landowners. Since the definition of a small harvester is different for forest practices than the RFA, small landowners are identified using a potential harvest limit of two million board feet, as stipulated in the compensation program and defined by forest practices.

[4] The 1999 Salmon Recovery Act, 1999 Laws, 1st Special Session, Chapter 4.

DATA

The study utilizes GIS and other data provided by the DNR. The DNR has collected detailed spatial information for 158 random sections within Washington State. Ninety-two sections were sampled in western Washington and 66 sections were sampled in eastern Washington. Selection criteria were that the section must include private ownership; it must contain some forestland; and it must not be entirely within a habitat conservation plan area or an urban growth area.

The GIS data for the sections include section boundaries, parcel information from the county assessor's office, timber stand/land cover information from photo interpretation, buffer zones for the proposed new rules and current rules, new water type and road information (see Figure 4).

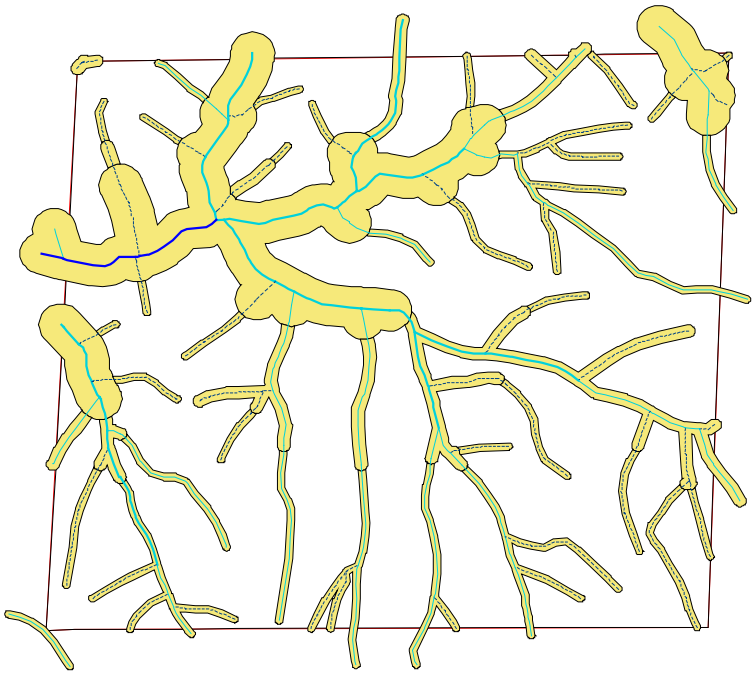


Figure 4. A sampled section with water and buffer information for a single ownership.

The assumptions on western Washington buffers were based on slope and water type. Buffer widths were digitized in GIS to reflect the riparian habitat management requirements summarized previously under the proposed new rules section. In western Washington, for Type S and F waters, a buffer width of 170 feet on each side was established. The 170-foot buffer corresponds to the core and inner zone width, which has a maximum width of 150 feet, plus 20 feet for the outer zone. The additional 20 feet of width assumes the 20 riparian leave trees per acre would cover an additional 20 feet of buffer on average. Type N waters received a 50-foot buffer stream for perennial streams and a 30-foot buffer for seasonal streams. There is a 50% allowance for harvest from perennial buffer. Harvesting is permitted in the seasonal stream buffer with appropriate mitigation.

In eastern Washington, for Type S and F waters, a buffer width of 100 feet on each side was established. The 100-foot buffer corresponds to the core and inner zone, which has a maximum

width of 100 feet. The width of the outer zone is 0 to 55 feet depending on site and stream width. In eastern Washington for Type N waters a 50-foot buffer stream was established for perennial streams and a 30-foot buffer was measured for seasonal streams.

Economically inaccessible acres were identified by visually examining each section to determine whether the proposed buffers alter accessibility to other areas in the parcel. The data on inaccessible acres was incorporated into the GIS database. To determine economic accessibility the study assumes forest businesses decide not to cross a stream under the new regulations because the area in question has a value lower than what it would cost to cross the stream. Selecting inaccessible areas was carried out by first assigning a technician the task of identifying potentially inaccessible areas using GIS software. A three-person team also evaluated the areas and determined if the areas would be classified as inaccessible. Several factors were considered when determining the accessibility of the areas. Size of the area in question was considered important. A small sliver that is cut from the rest of the parcel is more likely to be considered inaccessible than if the whole parcel is cut off because of the larger value associated with harvesting a larger land area. The number and size of additional parcels the landowner must cross to get around the stream was also considered important. Ownership patterns were also considered, since the same owner may own neighboring parcels. Finally, roads outside the sample section were consulted to determine whether areas bounded by the section boundary were inaccessible. In western Washington 219 acres were classified as inaccessible. In eastern Washington 209 acres were classified as inaccessible. Examples of inaccessible areas are pictured in Figure 5.

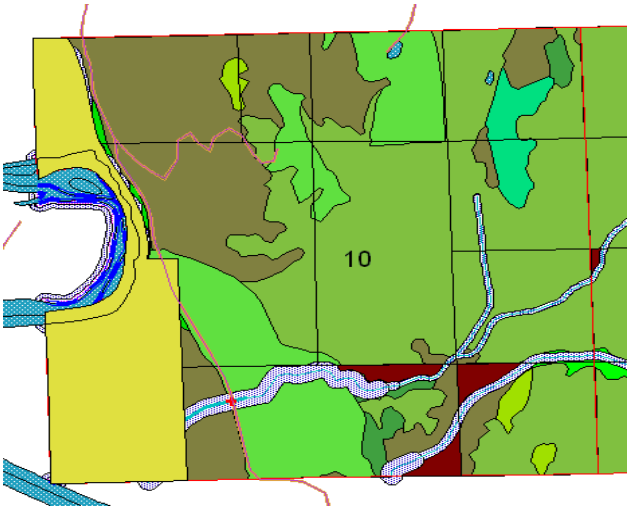


Figure 5. Economically inaccessible areas are indicated as brown (dark) triangles in the lower right portion of the chart.

Forest businesses with a total forestland ownership of less than eighty acres were identified from the parcel data collected from county records. Within this group, parcels that contained 20 acres or less were identified. These forest businesses, which meet both conditions, are deemed exempt from the new proposed rule changes and are also analyzed. They are subject to the permanent

forest practices rules in effect as of January 1, 1999 plus increase protection equal to 15% of the total land area.

The timber stand/land cover information is classified into 11 categories based on earlier work by DNR (1997).[5] Codes used for the forest-type are listed in parenthesis.

Brush/recent clear cut (eastern Washington data only) (B)	0 - 5 years
Reproduction (R)	5 - 15 years
Conifer Pole timber (CP)	15 - 30 years
Conifer Saw timber (CS)	30 - 100 years
Over Mature conifer timber (CL)	100 + years
Hardwood Pole timber (HP)	15 - 30 years
Hardwood Saw timber (HS)	30 - 60 years
Over Mature hardwood timber (HL)	60 + years
Mixed conifer/hardwood pole timber (MP)	(30% - 70%)
Mixed conifer/hardwood saw timber (MS)	(30% - 70%)
Mixed conifer/hardwood over mature timber (ML))	(30% - 70%)

The study uses the average value of timber sales per acre over the last three years aggregated for each county from the Department of Revenue (DOR). The average value of timber sales is calculated by using the total sales value divided by total acres, then aggregated by county to find an average county figure. This value is then matched to each parcel's county. To be able to use the DOR values we assume that the vegetation distribution for the average sale is similar to the vegetation distribution of RMZ acres and that the saw and mature timber stand types are harvestable. The advantage of using the value per acre parameter is that it permits calculating the timber asset value without introducing more complex assumptions on a species' volume distributions and their corresponding prices for each potential sale.

Table 1 illustrates the per acre values calculated for each county. We apply these values to the sum of acres in the pole timber type (CP, HP, MP), saw timber type (CS, HS, MS) and over-mature timber type (CL, HL, ML). In eastern Washington, Kittitas and Okanogan counties had less than $1000 per acre values. In western Washington, Kitsap County had the lowest per acre values followed by Jefferson and Mason counties.

[5] Department of Natural Resources. (1997). Small Business Economic Impact Statement on Water Typing Rules.

Table 1. Per acre values based on Department of Revenue data on recent timber sales.

Eastside Counties		Westside Counties	
County	Per acre value[a]	County	Per acre value[a]
CHELAN	$2,451.89	CLALLAM	$10,560.76
COLUMBIA	$4,642.83	CLARK	$11,004.14
FERRY	$1,058.02	COWLITZ	$12,659.27
GARFIELD	$2,451.89	GRAYS HARBOR	$14,592.31
KITTITAS	$778.47	JEFFERSON	$6,238.56
KLICKITAT	$3,499.87	KING	$12,742.27
LINCOLN	$2,451.89	KITSAP	$3,721.30
OKANOGAN	$786.73	LEWIS	$13,034.25
PEND OREILLE	$2,451.89	MASON	$8,427.62
SPOKANE	$3,500.00	PACIFIC	$13,420.28
STEVENS	$2,187.43	PIERCE	$12,585.76
		SKAGIT	$10,863.43
		SKAMANIA	$13,206.64
		SNOHOMISH	$13,365.47
		THURSTON	$12,798.15
		WAHKIAKUM	$13,047.26
		WHATCOM	$11,459.97

[a] per acre average calculated using Department of Revenue timber sale data from July 1997 to March 2000.

The study assumes a value of future harvests on reproduction acres where there has been a cost incurred in the establishment of a new stand. To capture the future loss in revenues associated with this sunk cost, we calculate the NPV at a 5.8% discount rate using the DOR per acre values 50 years into the future. The sunk cost is an addition to the bare land value. Table 2 presents the county sunk cost estimate used to determine replanting investments associated with the reproduction timber type acres. The calculation assumes constant real prices will continue into the future.

Table 2. Reproduction acres sunk cost calculations.

Western Washington		Eastern Washington	
County	Per acre value	County	Per acre value
CLALLAM	$ 630.10	CHELAN	$ 146.29
CLARK	$ 656.56	COLUMBIA	$ 277.01
COWLITZ	$ 755.31	FERRY	$ 63.13
GRAYS HARBOR	$ 870.64	GARFIELD	$ 146.29
JEFFERSON	$ 372.22	KITTITAS	$ 46.45
KING	$ 760.26	KLICKITAT	$ 208.82
KITSAP	$ 222.03	LINCOLN	$ 146.29
LEWIS	$ 777.68	OKANOGAN	$ 46.94
MASON	$ 502.83	PEND OREILLE	$ 146.29
PACIFIC	$ 800.72	SPOKANE	$ 208.83
PIERCE	$ 750.92	STEVENS	$ 130.51
SKAGIT	$ 648.16		
SKAMANIA	$ 787.97		
SNOHOMISH	$ 797.45		
THURSTON	$ 763.60		
WAHKIAKUM	$ 778.46		
WHATCOM	$ 683.75		

Source: Uses DOR per acre values discounted 50 years at 5.8%

The study utilizes land values published by Mason, Bruce & Girard, Inc. (1997)[6]. The average land value is $452 per acre for western Washington and $44 per acre for eastern Washington.

The volume of timber is taken from an earlier SBEIS on water typing (DNR 1997)[7]. Table 3 replicates the data for western and eastern Washington.

[6] Mason, Bruce & Girard, Inc. (1997). *Proposed Statutory Land Values for Purposes of Forest Land Taxation in State of Washington*

[7] Department of Natural Resources. (1997). Small Business Economic Impact Statement on Water Typing Rules.

Table 3. Estimated volume of board feet for the timber types

Timber Type	Western Washington	Eastern Washington
Non-Forest	0	0
Brush	n.a.	0
Reproduction	0	0
Conifer Pole	12,000	9,600
Conifer Saw	40,000	32,000
Conifer Large Saw	75,000	
Hardwood Pole	5,000	4,000
Hardwood Saw	20,000	16,000
Hardwood Large Saw	35,000	
Mixed pole	15,000	12,000
Mixed saw	30,000	24,000

Data on Uniform Business Identification (UBI) and employment from county records was collected by the DNR and incorporated into the GIS database. Each parcel was assigned to one of two categories depending on whether or not there were greater than 50 employees in the business.

The study uses GIS transportation information for each parcel in the sample to determine the compliance cost of road maintenance and stream crossings. The compliance cost is the present value of total road maintenance and stream crossing costs distributed evenly over a 15-year period. Table 4 presents the number of stream crossing by large and small businesses.

Table 4. Number of stream crossings

	Western Washington	Eastern Washington
Large Business		
Type S,F	161	18
Type N perennial	117	15
Type N seasonal	342	19
Small Business		
Type S,F	49	17
Type N perennial	7	0
Type N seasonal	2	3

Table 5 summarizes the road miles associated with large and small businesses in western and eastern Washington.

Table 5. Number of road miles

	Western Washington		Eastern Washington	
	Large Business	Small Business	Large Business	Small Business
Road miles	202	44	30	15

Maintenance and repair costs assumptions are presented in Table 6. These estimates were derived from personal communications between DNR and representatives from large and small enterprises in western and eastern Washington.

Table 6. Per unit costs for stream crossings and road miles used in the analysis.

	Western Washington	Eastern Washington
Stream Crossing		
Type S,F	$40,000	$41,000
Type N perennial	$5,933	$5,267
Type N seasonal	$1,500	$3,200
Roads (per mile)	$12,000	$12,000

Stream miles are used to calculate setup costs. RMZ setup cost estimates were derived from personal communications between DNR and representatives from large and small enterprises. The estimates were broken down by water type. Table 7 categorizes stream miles by water types between large and small businesses for western and eastern Washington. RMZ setup costs associated with 1000 feet of stream are presented in Table 8.

Table 7. Stream length in 1,000 feet.

	Western Washington	Eastern Washington
Large Businesses		
S, F type	725.1	168.7
N type	975.4	593.9
Small Businesses		
S, F type	294.6	140.6
N type	40.2	23.3

Table 8. Setup costs per 1000 feet of stream

	Western and Eastern Washington	
	Large Business	Small Business
Type S,F	$470	$940
Type N	$140	$280

Employment data was gathered from the US Census, County Business Patterns for Washington. Table 9 presents employment multipliers used to calculate the effects of the volume reduction on employment in the lumber dependent economy. Significant changes in the employment multipliers have occurred since 1987. We use the 1997 figure to represent the current employment condition and do not incorporate any adjustments that might occur over time.

Table 9. Eastern Washington employment per million board feet

	SIC 8	SIC 24	SIC 26	SIC 241	SIC 242	SIC 243	SIC 503	SIC 511
1987	0.04	5.14	1.32	1.11	2.98	0.84	0.71	1.62
1988	0.10	5.42	0.89	1.29	3.08	0.68	0.65	0.50
1993	0.12	7.74	1.99	1.74	3.69	1.59	0.98	0.75
1994	0.21	8.51	2.23	1.89	3.67	1.83	1.20	0.84
1995	0.20	7.87	2.16	1.72	2.31	2.66	1.19	0.74
1996	0.11	6.09	1.99	1.29	1.75	2.40	1.09	0.80
1997	0.25	6.71	2.13	1.28	2.67	2.09	0.78	0.78
Averages								
87-93	0.09	6.10	1.40	1.38	3.25	1.04	0.78	0.95
94-97	0.20	7.29	2.13	1.55	2.60	2.24	1.07	0.79

Source: U.S. Census Bureau 1987-1997. County Business Patterns (SIC)

Table 10. Western Washington employment per million board feet.

	SIC 8	SIC 24	SIC 26	SIC 241	SIC 242	SIC 243	SIC 503	SIC 511
1987	0.42	5.13	1.89	1.56	1.57	1.33	0.84	0.47
1988	0.40	5.16	2.56	1.55	1.77	1.34	0.93	0.52
1993	0.59	8.01	4.54	2.28	2.55	2.20	1.70	1.14
1994	0.58	8.01	4.52	2.27	2.66	2.18	1.81	1.24
1995	0.57	7.44	4.38	2.04	2.49	2.02	1.98	1.13
1996	0.57	7.60	4.12	2.19	2.44	2.07	2.09	1.26
1997	0.57	7.87	4.21	2.06	2.64	2.19	1.98	1.38
Averages								
87-93	0.47	6.10	3.00	1.80	1.96	1.63	1.16	0.71
94-97	0.57	7.73	4.30	2.14	2.56	2.12	1.97	1.25

Source: U.S. Census Bureau 1987-1997. County Business Patterns (SIC)

Total harvests for western and eastern Washington are 3.258 BBF and 0.999 BBF respectively for 1997.[8] The total harvest numbers are used to derive the wage losses for the state.

The study uses the long-term derived price elasticity of demand for sawlogs from Perez-Garcia and Kraley (2000)[9] to analyze the medium and long-term effects of the new proposed rule changes. The elasticity estimate presented in that study ranges from -0.42 to -0.56.

[8] David Larson. 1998. Washington Timber Harvest 1997. Washington State Department of Natural Resources. Resource Planning and Asset, Olympia, Wa.

[9] Perez-Garcia and Kraley. 2000. Long-term price elasticity of demand for timber from western and eastern Washington. Unpublished manuscript. University of Washington, College of Forest Resources, Seattle Wa.

DATA ANALYSIS

Data was imported into spreadsheets for analysis and determination of the compliance cost ratios. A first step in the data analysis is to identify the two study groups for the SBEIS. Businesses with 50 or more employees were classified as large businesses. All other businesses were classified as small businesses.

In western Washington 1,327 businesses were included in the sample. Twenty-five businesses are classified as large businesses. The study uses all of the largest businesses in the sample to describe the 10% of businesses that are the largest businesses required to comply.

In eastern Washington 624 businesses were included in the sample. Fourteen businesses are classified as large businesses. As in the case of western Washington, the study uses all of the largest businesses in the sample to describe the 10% of businesses that are the largest businesses required to comply.

Table 11. Acreage distribution for Washington sample.

	Western Washington	Eastern Washington
	Acreage[a]	Acreage[a]
Large Businesses[b]	26,860	5,597
Small Businesses[c]	19,040	23,142
> 20 acres ownerships	10,895	17,108
< 20 acres ownerships[d]	8,145	6,034
Grand Total	45,900	28,739

[a] includes all timber type categories.
[b] businesses with 50 or more employees.
[c] all owners that are not classified as large businesses.
[d] acres associated with owners under the 20 acre exemption rule.

Table 11 displays the acreage distribution for western and eastern Washington. This distribution is important since it is the basis for calculating the timber parcel asset value and the foregone sales associated with the RMZ. In western Washington the majority of the acreage is owned by large businesses, while in eastern Washington the majority of the acreage is owned by small businesses. A significant number of businesses own less than 20 acres of land in western and eastern Washington. In western Washington 43% of the land is owned in 20 acre or smaller parcels and in eastern Washington 16% of the land is owned in 20 acre or smaller parcels.

Figure 6 presents the percent of acres found in total forested acres, the acres affected by rule changes (proposed rules acres minus current buffer acres plus inaccessible acres), and non-impacted acres for the western Washington. The chart includes all acres in the sample except for those classified as non-forested, brush or grasslands. The percent is calculated as the acres in the timber type category divided by the total acres times 100%.

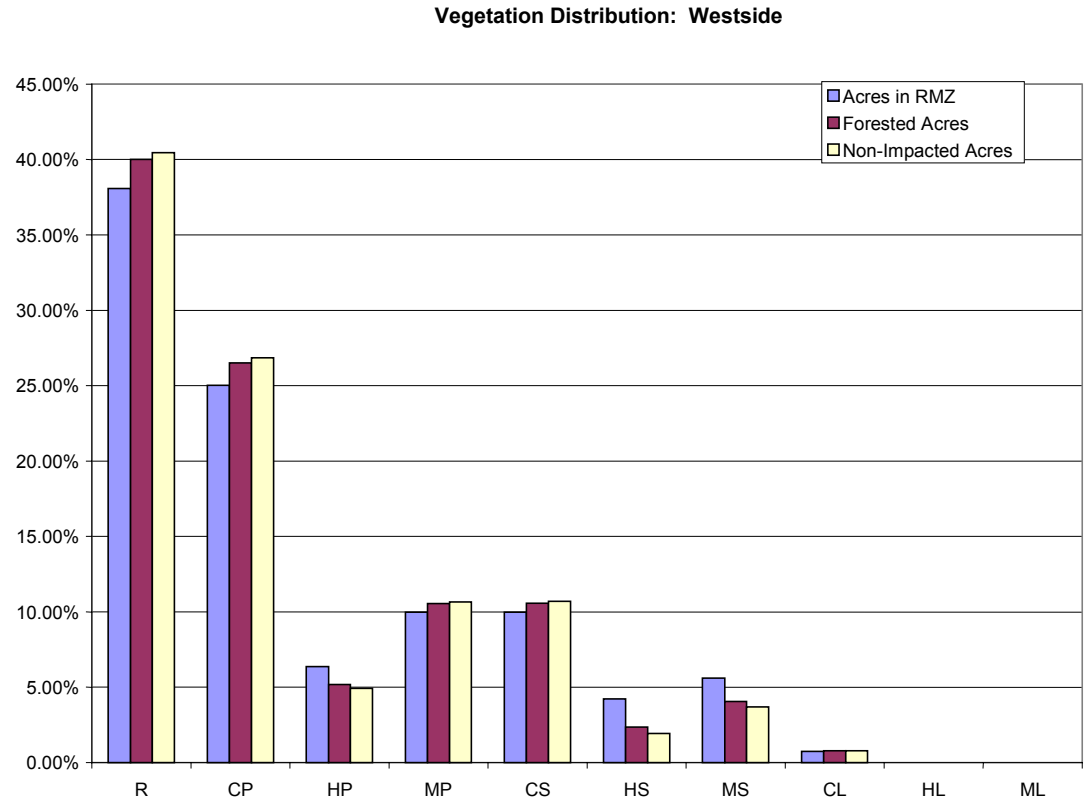


Figure 6. Western Washington acre distribution by forest types.

The vast majority of acres in the western Washington sample are in the reproduction stage (R) and coniferous pole timber (CP) categories, followed by mixed pole timber (MP) and conifer saw timber (CS). The three categories represent close to three-quarters of the acres in the sample. There is a lower percentage of acreage in reproduction, coniferous pole timber, mixed pole timber, and coniferous saw timber type in the RMZ acres than the non-impacted acres. There is also a higher percent of acres in the hardwood pole (HP), hardwood saw timber (HS) and mixed saw timber (MS) categories in RMZ buffer acres than non-impacted acres.[10]

The eastern Washington distribution of sampled acres by forest type is markedly different than the western Washington sample as illustrated by Figure 7. Most of the acres have an older structure with coniferous pole (CP) and saw timber (CS) representing over 80% of the acres. The riparian management acres also have a larger percentage of acres in coniferous saw timber (CS) than non-impacted acres. There is a lower percent of acres in the reproductive forest type category for the riparian management acres. Therefore, a larger percent of non-impacted acres are in the reproduction (R) forest-type categories. This situation is also true for the coniferous

[10] Non-impacted acres are acres outside the RMZ in a parcel. The sum of acres in buffers and non-impacted acres is equal to forested acres.

pole (CP) timber. For the conifer saw timber (CS), the regulated acres have a higher percent than the non-impacted acres.

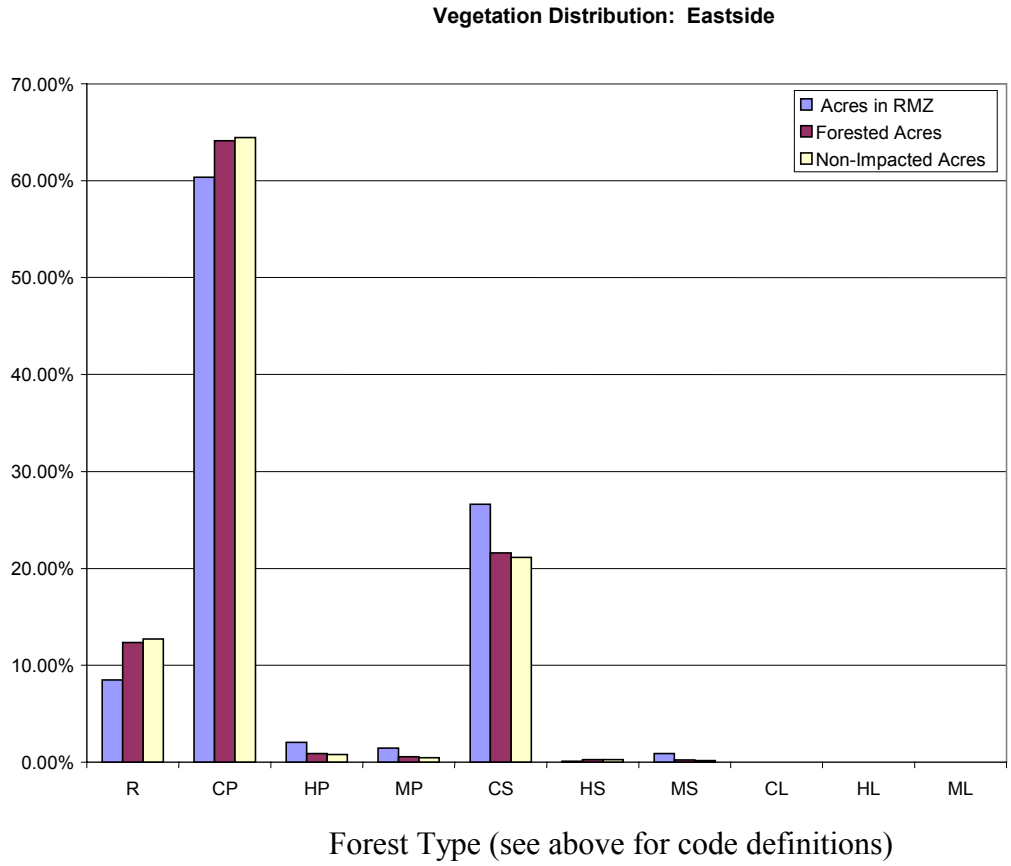


Figure 7. Eastern Washington acre distribution by forest types.

The next chart (Figure 8) describes the acreage distribution of hardwood vegetation in buffers among small and large businesses for those firms that have hardwood vegetation. The chart illustrates, for example, for those firms that have 20% of the buffer area in hardwood or mixed forest type, the remaining area would contain 80% of the conifer type. The figure suggests small firms have a higher percentage of their land area in buffers in hardwood or mixed vegetation types. The average percentage for small businesses is 49% versus 35% for large businesses.

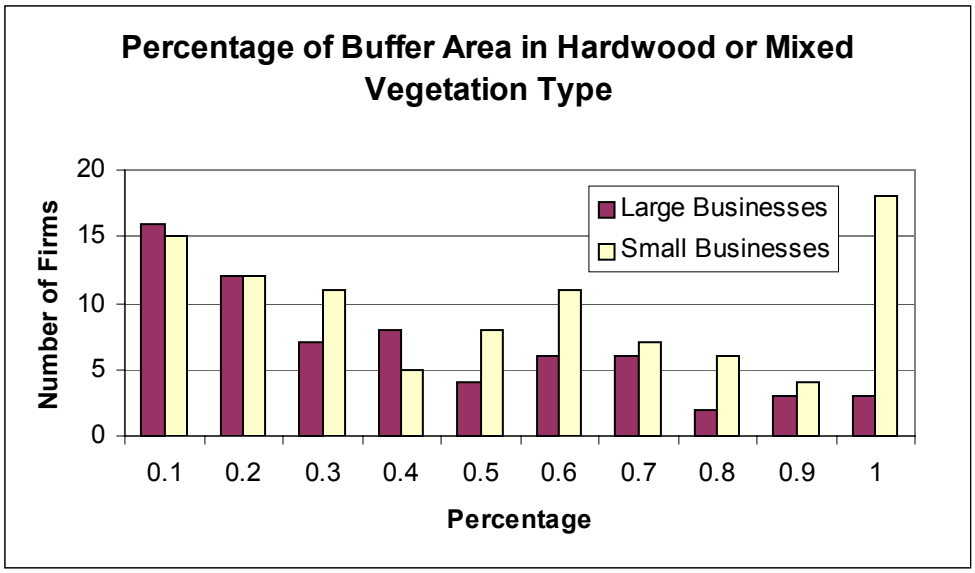


Figure 8. Percentage of Buffer Area in Hardwood or Mixed Vegetation Type

Table 12 below presents the distribution of acres under hardwood or mixed vegetation among stream types. A larger proportion of the acreage is found in buffers around fish bearing streams for small businesses. It implies that small businesses will have fewer management alternatives available to them since there are fewer options to harvest timber from fish bearing stream buffers.

Table 12: Percent of hardwood or mixed vegetation buffer acres under proposed rules by stream type

	Fish Bearing Streams	Non-fish Bearing Streams	
		Perennial	Seasonal
Large Businesses	82%	7%	10%
Small Businesses	97%	2%	1%

THE NET EFFECT OF PROPOSED NEW RULES ON FOREST BUSINESS VALUES

Table 13 presents the ratios required by the RFA (rows 6 and 12) examining the conditions before and after the new proposed permanent rule.

Table 13: The Effect of New Proposed Rules on Timber Asset Values

		1		2	
		Large Businesses	Ratio	Small Businesses	Ratio
	Western Washington				
1	Total Parcel Asset Value	$ 95,531,561		$ 30,044,668	
2	RMZ foregone sales	$ 10,603,826	11.1%	$ 5,736,794	19.1%
3	Road Maintenance and Stream Crossings	$ 6,609,668	6.9%	$ 1,667,200	5.5%
4	Setup Cost	$ 477,341	0.5%	$ 288,188	1.0%
5	Total Cost for Timber businesses (2+3+4)	$ 17,690,835	18.5%	$ 7,692,182	25.6%
6	Ratio (5 / 1)	18.5%		25.6%	
	Eastern Washington				
7	Total Parcel Asset Value	$ 4,778,859		$ 3,824,189	
8	RMZ foregone sales	$ 199,695	4.2%	$ 467,858	12.2%
9	Road Maintenance and Stream Crossings	$ 811,612	17.0%	$ 579,968	15.2%
10	Setup Cost	$ 45,447	1.0%	$ 138,663	3.6%
11	Total Cost for Timber businesses (8+9+10)	$ 1,056,754	22.1%	$ 1,186,489	31.0%
12	Ratio (11 / 7)	22.1%		31.0%	

Notes: RMZ foregone sales do not include cost associated for mitigation on seasonal Type N waters with equipment limitation zone. Fifty percent harvests occur on Type N perennial waters. RMZ foregone sales (row 2 and 8) assume forest management in inner and outer zones of Type S, and F buffers permits 50% of harvest for large businesses. BLV was taken from WF&PA estimate.

Table 13, rows 1 and 7 contain the total parcel asset value for western and eastern Washington respectively. They are determined by calculating the value of total acreage for each sampled business and then summing them to arrive at the sample total. The RMZ foregone sale values (rows 2 and 8 for western and eastern Washington, respectively) are determined by calculating the value of net acres under the new proposed rule changes for each sampled business, then summing it for the sample total. Road maintenance and stream crossings and RMZ setup costs

are calculated in a similar manner. The total cost (rows 5 and 11) for western and eastern Washington is the sum of the RMZ foregone sales, road maintenance and stream crossing cost and setup cost.

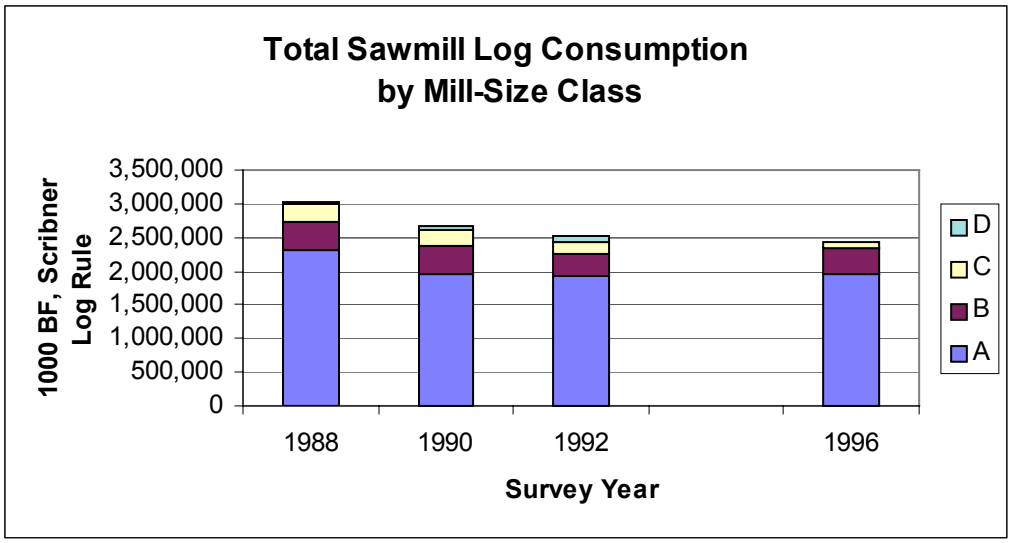
In western Washington, small businesses will bear a larger impact than large businesses, 25.6% versus 18.5%. In eastern Washington, small businesses will bear a larger impact than large businesses, 31.0% versus 22.1%.

The major component of compliance cost in western Washington is the foregone sales associated with the establishment of riparian habitat buffers. The effect is disproportionately larger for small businesses (19.1%) versus large businesses (11.1%). Road maintenance and stream crossing cost add an additional 6.9% and 5.5% of the total asset value for large and small businesses respectively. The effect on large businesses is slightly larger than the impact on small businesses. RMZ setup costs add a smaller percentage to the new proposed rule compliance cost--0.5% and 1.0% for large and small businesses respectively.

The major component of compliance cost in eastern Washington is associated with road maintenance and stream crossings. For large businesses, it is more than three quarters of the compliance cost. For small businesses, road maintenance and stream crossings comprise nearly half of the compliance costs. Small businesses also incur a substantial cost in the form of foregone sales associated with establishing RMZ. Twelve percent of the total parcel asset value for small businesses is compliance cost related to RMZ versus 4.2% for large businesses. RMZ setup costs are also three times as large for small businesses than large businesses.

EMPLOYMENT COSTS

The lost revenues presented above do not include losses in employment associated with reduced timber harvests. It is difficult to distinguish losses to large businesses from those of small businesses however. Based on the discussion presented below, it is likely that the smaller logging, saw milling, and mill working businesses will be adversely affected compared with the larger businesses in these categories. As with the case of sawmills discussed below, smaller mills in other sectors—forestry and logging, for example--are likely to absorb the majority of the impact from lower available timber volumes.



Source: Washington Mill Survey (various years). Class D mills are less than 40,000 board feet per lumber tally capacity per 8 hour shift; Class C mills are 40,000 to 79,999 bf; Class B mills are 80,000 to 119,999 bf; Class A mills are 120,000+ bf. (No survey was conducted in 1994)

Figure 9. Total sawmill log consumption by mill-size classes

Figure 9 illustrates log consumption by the four mill-size classes defined in the Washington Mill Survey. Timber harvests declined from a peak of 3 billion board feet (BBF) in 1988 to just under 2.5 BBF in 1996. Adjustments in the larger Type A mills occurred by 1990. Since then, including the period of reduced timber supply from federal lands, log consumption by the smaller-sized mills has declined. The chart suggests that the smaller mills reduced their consumption of saw logs during reduced harvests from public and private lands from environmental restrictions in the early 1990's more so than the largest mills.

Even though the full impact from the supply restrictions was alleviated in part by the diversion of log exports to domestic mills, the survey suggests that smaller mills were not able to compete with larger mills for these logs. A log export ban was implemented in the early 1990s restricting exports of logs produced from state lands. The reduction in the volume of logs consumed by the saw-milling sector from 1988 to 1992 is 17%. The volume reduction due to the new proposed rule changes is 16% on average across the state. A 16% reduction in saw log availability is equivalent to 0.4 BBF, about the consumption of Type D, C and B mills in 1996. As the size of the export log market continues to decline—and as a consequence the buffer of timber available to divert to the domestic market--competition among domestic mills for available logs will be greater. It is likely that the smaller mills will face stronger competition for their log supply. The effect of a tighter log market for smaller mills is likely to be delayed with a weakening in demand as is projected for the 2001 calendar year. The implication is that further closures of small mills are likely to take place.

While data readily exists for the saw-milling sector (SIC 241) from the biennial mill survey, no such data is readily available for other sectors. It is likely that they will behave similarly, with the exception of SIC 26, Pulp and Paper. Forestry (SIC 08) is largely composed of units less than 50 employees in both eastern and western Washington (see Appendix Table A1 for

employment breakdown). Ninety-seven percent of the logging firms (SIC 241) are small businesses. They comprise 58% of the employment. Seventy-five percent of the western sawmills, plywood mills (SIC 242) are small businesses (less than 50 employees) employing 12% of the all SIC 242 employees for first quarter 2000. Sixty percent of the SIC 242 mills in eastern Washington are small businesses employing 11% of the workers in SIC 242.

Table 14. Employment Costs

	Multiplier	1997 Employment	Reduced Employment	Lost Employment	1997 Avg. Salary	Lost Wages
Eastern Washington						
SIC_8	0.25	246	225	21	$23,919	$502,299
SIC_24	6.71	6513	5969	544	$28,269	$15,378,336
SIC_26	2.13	2068	1895	173	$38,951	$6,738,523
SIC_241	1.28	1246	1142	104	$27,291	$2,838,264
SIC_242	2.67	2595	2378	217	$28,812	$6,252,204
SIC_243	2.09	2034	1864	170	$22,282	$3,787,940
SIC_503	0.78	760	696	63	$38,027	$2,395,701
SIC_511	0.78	762	698	64	$32,541	$2,082,624
Western Washington						
SIC_8	0.57	1860	1491	369	$22,885	$8,444,565
SIC_24	7.87	25580	20509	5071	$30,406	$154,188,826
SIC_26	4.21	13676	10965	2711	$45,253	$122,680,883
SIC_241	2.06	6681	5356	1324	$32,250	$42,699,000
SIC_242	2.64	8588	6886	1702	$33,235	$56,565,970
SIC_243	2.19	7131	5717	1414	$27,223	$38,493,322
SIC_503	1.98	6451	5172	1279	$33,774	$43,196,946
SIC_511	1.38	4473	3586	887	$25,274	$22,418,038

Table 14 calculates lost wages associated with a reduction in harvest of 10% in eastern Washington and 20% in western Washington, by sector. Since timber has a long management cycle, the impact of lower timber harvests on employment will take place over time and depends on market conditions that are discussed below. Nevertheless, the lost employment from a reduced timber base suggests substantial wage losses and potentially large disproportionate impacts on small businesses. The losses amount to nearly $16 million in eastern Washington for the forestry and saw-milling sectors (mostly assumed to impact small businesses) and nearly $7 million for the pulp and paper sectors (mostly assumed to impact large businesses). In western Washington, the losses are over $160 million for the saw-milling and forestry sectors (again assumed to be mostly small businesses) and $123 million for the pulp and paper sectors.

Market conditions may potentially affect the impact of increased riparian habitat buffers on the timber asset values and employment losses through a price effect. In particular, potential price changes may influence the value of the timber that can be sold and hence reduce the cost of compliance for some forest businesses. The higher timber values would benefit timber owners while timber purchasers would face increased raw material costs to the extent that they cannot pass on the increase to final consumers. Given the national and international nature of both the lumber and pulp and paper markets, Washington mills do not possess the market power to influence market prices, hence their ability to pass on the added costs to consumer is limited. Nevertheless, timberland owners may see an increase in value and this potential increase needs to be evaluated.

The price response depends on the percent substitution of foregone timber harvests and existing market demand conditions. The greater this substitution, the lower the effect on price, the less likely timber prices will change. Lower demand for wood products will also lower any upward price pressure from lower timber harvests. Over time, as demand recovers, the foregone timber will likely be substituted by harvests from other areas, which is likely to lessen any growth in the price of timber from reduced supplies. As a result the potential increase in value of timber that can be sold may not be very large due to substitution possibilities and reduced demand.

The potential reduction in timber volume for western Washington is estimated at 650 million board feet. The price elasticity of timber[11] suggests that unless demand declines and no substitute timber is available to fill in for the shortfall, prices may increase by 40%. However, there is likely to be a decline in demand that will offset the projected timber shortage and prevent timber prices from climbing higher. That reduction in demand may be as large as a 2.5% drop in housing starts for next year, which would lower current log consumption by as much as 7.5% for 2001. This demand decline may be large enough to offset a substantial portion of the estimated 650 million board foot decline in timber supply. Harvests in the short-term from available non-impacted acres can further reduce the price effect from increased riparian buffer area. Therefore, in the short-term, prices may not rise due to these two factors that will offset and substitute for the reduced timber availability. With the recovery of lumber markets in 2002, renewed demand pressure will likely impose upward pressure on timber prices. Renewed upward price pressure over the medium and long term may occur. However, substitution from other areas where timber costs are lower may offset any substantial price increase associated with the reduced harvest in western Washington in the longer term. As a result, if a price increase results from reduced timber availability, it is likely to be short-term in nature and have a minimal impact on the cost of compliance.

The situation in eastern Washington is similar. The same decline in demand expected in the western region is also likely to reduce any immediate price increase in the timber markets. The projected reduction of 97 million board feet in timber would result in a price increase of nearly 20% if no reduction in demand or timber substitution were to occur. However, both the expected reduction in demand and the availability of non-impacted area timber in the short-term is likely to reduce any potential price increase to timber owners.

[11] Perez-Garcia and Kraley. 2000. Long-term price elasticity of demand for timber from western and eastern Washington. Unpublished manuscript. University of Washington, College of Forest Resources, Seattle Wa.

MITIGATION

In response to RFA, the FPB and the Washington State Legislature have taken steps to reduce the cost of the proposed new forest practices rules on small businesses. The steps include the following:

1) Delaying compliance timetables - Road maintenance and abandonment plans required by the new rules have different submittal deadlines for small landowners. Small landowners are allowed to submit the road maintenance and abandonment plan concurrent with an application so the landowners would be closer in time to realizing revenue from a harvest.

2) A riparian easement program was established for small landowners who harvest less than two million board feet of timber per year. This program acquires easements from small forest landowners along riparian and other areas of value to the State for protection of aquatic resources. The participants are compensated for trees that are required to be left after harvest in the riparian area.

The compensation program would pay an estimated $0.68 on average for western Washington small landowners for every $1.00 of lost sales resulting from new RMZ. The estimate is calculated using the sampled businesses, identifying small harvesters based on available timber for harvests in the short term.[12] The total compensation package for the small businesses that were sampled for the study would total $3.9 million compared to the $5.7 million in lost sales associated with the RMZ.

The compensation for eastern Washington is estimated at $0.50 on average for small landowners for every $1.00 of lost sales from the new RMZ. The total compensation for those businesses sampled amounts to $233,000 compared to the $467,000 in foregone sales. The difference in compensation between eastern and western Washington is due to the higher proportion of compliance cost associated with road maintenance and stream crossing in eastern Washington.

3) Small landowners who own less than 80 acres statewide (with a forest practices application on less than 20 acres) are not required to follow the new forest practices rules for riparian protection but are subject to the permanent riparian management zone rules and watershed analysis prescriptions in effect as of January 1, 1999, plus an additional 15% volume requirement where watershed analysis prescriptions are not in effect. These landowners will be allowed to harvest more timber than larger landowners under the new rules.

The mitigation for these small landowners is substantial. In western Washington, the mitigation reduces potential foregone sales from $1.1 million to $147,000. In eastern Washington the compliance cost is reduced by $800,000 (the estimated value of lost sales).

4) Small landowners with timber harvests of less than 2 million board feet receive a 16% tax credit on taxes imposed under RCW 84.33.074 for complying with the new forest practices rules.

[12] Small businesses are defined differently for the compensation program than under the RFA. However, the sampled businesses labeled as small are identical under both definitions.

The harvesters will pay a lower timber tax for timber harvested in compliance with the new proposed rules.

5) The DNR established a small forest landowner office to be a resource and focal point for small forest landowner concerns.

6) Other mitigation measures listed in the new proposed forest practices rules that available to all landowners include: alternate plans, multi-year permits, and Habitat Conservation Plan (HCP) exemptions. Alternate plans allow a landowner to develop an alternate method of protecting public resources that might better fit their particular situation, yet still provide equal or a greater level of protection of public resources. Those landowners that have unusual constraints that make it difficult to comply with the forest practices rules as written have an option to propose an alternate plan. Multi-year permits allow a landowner in a watershed analysis unit to instigate multiple forest practice actions for up to 5 years as opposed to the standard 2-year permit. Landowners with an approved HCP that provides for species protection under the forest practices rules are not subject to forest practices rules.

APPENDIX: SUPPLEMENTAL DATA

Table A1. Employment breakdown by sector

SIZE OF FIRM, FIRST QUARTER 2000
COVERED EMPLOYMENT AND PAYROLLS
FOR SELECTED SIC CODES

	STATEWIDE				EASTERN WASH				WESTERN WASH			
SIC	**UNITS <50**	**EMP < 50**	**UNITS>=50**	**EMP>=50**	**UNITS <50**	**EMP < 50**	**UNITS>=50**	**EMP>=50**	**UNITS <50**	**EMP < 50**	**UNITS>=50**	**EMP>=50**
081	115	481	*	*	10	16	*	*	105	465	*	*
241	921	3,812	24	2,717	243	743	*	*	678	3,069	*	*
242	180	1,555	67	11,317	26	267	17	2,164	154	1,288	50	9,153
243	235	2,737	45	6,951	41	427	10	1,964	194	2,310	35	4,987
26	78	1,079	57	14,418	15	197	10	1,931	63	852	47	12,487
5031	423	2,760	19	1,431	52	302	5	298	371	2,458	14	1,133
511	457	3,553	24	3,293	58	676	3	487	399	2,877	21	2,806
SIC												
081												
241	97%	58%	3%	42%								
242	73%	12%	27%	88%	60%	11%	40%	89%	75%	12%	25%	88%
243	84%	28%	16%	72%	80%	18%	20%	82%	85%	32%	15%	68%
26	58%	7%	42%	93%	60%	9%	40%	91%	57%	6%	43%	94%
5031	96%	66%	4%	34%	91%	50%	9%	50%	96%	68%	4%	32%
511	95%	52%	5%	48%	95%	58%	5%	42%	95%	51%	5%	49%

Source: Employment and Securities Data. An * indicates information withheld.

Table A2. Water type miles by old and new typing for western Washington

Water Body and Stream Miles Western Washington		Code 1		1 Total	Code 2		2 Total	Code 3		3 Total	Grand Total
WATER_TYPE	CNTY	no	yes		no	yes		no	yes		
1	CLALLAM	4.35	1.51	**5.87**							**5.87**
	CLARK	0.20		**0.20**							**0.20**
	COWLITZ	0.53	1.27	**1.80**							**1.80**
	GRAYS HARBOR	3.92	1.31	**5.24**							**5.24**
	JEFFERSON	4.02	0.24	**4.25**							**4.25**
	KING	6.58		**6.58**							**6.58**
	LEWIS	1.74	0.95	**2.69**							**2.69**
	MASON	5.13	3.05	**8.18**							**8.18**
	PACIFIC	0.28	4.51	**4.79**							**4.79**
	SKAGIT	0.73		**0.73**							**0.73**
	SKAMANIA	1.95	0.43	**2.38**							**2.38**
	SNOHOMISH	5.31		**5.31**							**5.31**
	THURSTON	2.97		**2.97**							**2.97**
	WAHKIAKUM		0.05	**0.05**							**0.05**
	WHATCOM	2.24		**2.24**							**2.24**
1 Total		**39.96**	**13.32**	**53.28**							**53.28**
2	CLALLAM	0.10	0.04	**0.14**							**0.14**
	GRAYS HARBOR	2.39	1.23	**3.61**							**3.61**
	KING	0.35		**0.35**							**0.35**
	MASON	0.43	1.39	**1.82**							**1.82**
	PACIFIC		0.86	**0.86**							**0.86**
	SNOHOMISH	1.09		**1.09**							**1.09**
	WHATCOM	0.33		**0.33**							**0.33**
2 Total		**4.68**	**3.51**	**8.19**							**8.19**
3	CLALLAM	4.23	3.07	**7.30**							**7.30**
	COWLITZ	0.08	2.25	**2.32**							**2.32**
	GRAYS HARBOR	2.93	11.92	**14.85**							**14.85**
	JEFFERSON	0.79		**0.79**							**0.79**
	KING	3.91	2.17	**6.08**				0.06		**0.06**	**6.14**
	KITSAP	2.20		**2.20**							**2.20**
	LEWIS	2.56	4.41	**6.96**							**6.96**
	MASON	2.58	4.88	**7.46**							**7.46**
	PACIFIC	0.05	6.78	**6.84**							**6.84**
	PIERCE	0.14	4.61	**4.75**							**4.75**
	SNOHOMISH	2.79		**2.79**							**2.79**
	THURSTON	0.19		**0.19**							**0.19**
	WHATCOM	1.06		**1.06**							**1.06**
3 Total		**23.51**	**40.08**	**63.59**				**0.06**		**0.06**	**63.65**
4	CLALLAM	1.23	1.08	**2.31**	0.00	0.30	**0.31**	0.30	0.45	**0.75**	**3.36**
	CLARK	1.25		**1.25**							**1.25**
	COWLITZ		3.82	**3.82**		3.41	**3.41**		0.69	**0.69**	**7.92**
	GRAYS HARBOR	0.59	3.27	**3.87**	0.00	0.28	**0.28**		0.10	**0.10**	**4.25**
	JEFFERSON	0.31		**0.31**							**0.31**

	KING	0.34	0.63	**0.97**	0.22	0.70	**0.92**	0.25	2.37	**2.62**	**4.50**
	KITSAP	0.31		**0.31**	0.66		**0.66**	0.13		**0.13**	**1.10**
	LEWIS	1.69	1.75	**3.44**		1.13	**1.13**		0.52	**0.52**	**5.08**
	MASON	2.91	0.43	**3.33**		0.51	**0.51**		0.86	**0.86**	**4.70**
	PACIFIC		4.66	**4.66**		2.71	**2.71**		2.05	**2.05**	**9.42**
	PIERCE	0.16	1.08	**1.23**							**1.23**
	SKAGIT	0.43		**0.43**							**0.43**
	SKAMANIA			**0.00**				0.04	0.65	**0.69**	**0.69**
	SNOHOMISH	1.64	0.15	**1.79**	0.12		**0.12**				**1.91**
	WAHKIAKUM		0.50	**0.50**		0.12	**0.12**		0.22	**0.22**	**0.84**
	WHATCOM	1.04		**1.04**							**1.04**
4 Total		**11.90**	**17.36**	**29.25**	**1.01**	**9.15**	**10.16**	**0.72**	**7.90**	**8.62**	**48.03**
5	CLALLAM	5.02	3.91	**8.93**	1.61	0.44	**2.05**	3.51	1.89	**5.40**	**16.38**
	CLARK	0.61		**0.61**	0.81		**0.81**				**1.42**
	COWLITZ	0.04	2.12	**2.16**		6.74	**6.74**		11.39	**11.39**	**20.28**
	GRAYS HARBOR	4.82	14.95	**19.77**	0.25	9.50	**9.76**	0.35	6.05	**6.40**	**35.93**
	JEFFERSON	1.70	0.03	**1.73**	0.88	0.30	**1.19**	0.35		**0.35**	**3.27**
	KING	0.71	1.44	**2.15**	1.07	1.22	**2.30**	2.83	8.47	**11.31**	**15.75**
	KITSAP	2.62		**2.62**							**2.62**
	LEWIS	6.55	3.65	**10.20**	0.17	2.34	**2.52**	0.29	8.05	**8.34**	**21.05**
	MASON	1.31	3.50	**4.81**		0.69	**0.69**		3.18	**3.18**	**8.68**
	PACIFIC	0.60	6.75	**7.36**		7.21	**7.21**		10.82	**10.82**	**25.39**
	PIERCE		3.06	**3.06**		0.86	**0.86**		1.15	**1.15**	**5.07**
	SKAMANIA	0.00	0.17	**0.17**	0.09		**0.09**	0.21	0.31	**0.52**	**0.77**
	SNOHOMISH	1.92		**1.92**	0.58		**0.58**				**2.50**
	WAHKIAKUM	0.13	1.50	**1.63**		1.62	**1.62**	0.09	2.44	**2.53**	**5.78**
5 Total		**26.02**	**41.09**	**67.11**	**5.46**	**30.94**	**36.40**	**7.64**	**53.74**	**61.38**	**164.88**
9	CLALLAM	0.16	0.21	**0.37**							**0.37**
	CLARK	3.18		**3.18**	0.14		**0.14**				**3.32**
	COWLITZ		0.44	**0.44**	0.18	2.01	**2.19**		6.40	**6.40**	**9.04**
	GRAYS HARBOR	1.17	2.84	**4.00**	0.82	2.67	**3.49**	0.10	3.10	**3.20**	**10.69**
	JEFFERSON	0.52		**0.52**	0.73		**0.73**	0.11		**0.11**	**1.36**
	KING	1.48	2.14	**3.62**	0.27	0.42	**0.68**	0.94	5.43	**6.37**	**10.67**
	KITSAP	0.97		**0.97**							**0.97**
	LEWIS	6.62	4.41	**11.03**	1.42	2.68	**4.10**	3.37	15.40	**18.77**	**33.90**
	MASON	9.87	4.40	**14.27**	0.11	0.78	**0.89**	0.23	4.62	**4.85**	**20.01**
	PACIFIC	0.76	5.53	**6.28**		7.61	**7.61**		24.39	**24.39**	**38.28**
	PIERCE	1.02	0.71	**1.73**		0.08	**0.08**				**1.81**
	SKAMANIA			**0.00**	0.05		**0.05**	1.00	0.28	**1.27**	**1.33**
	SNOHOMISH	4.07	0.04	**4.12**		0.25	**0.25**				**4.37**
	THURSTON	5.13		**5.13**	0.18		**0.18**	0.41		**0.41**	**5.72**
	WAHKIAKUM	0.18	1.25	**1.42**		2.02	**2.02**		4.86	**4.86**	**8.31**
	WHATCOM	1.72		**1.72**							**1.72**
9 Total		**36.85**	**21.96**	**58.81**	**3.89**	**18.53**	**22.42**	**6.15**	**64.48**	**70.63**	**151.86**
Grand Total		**142.91**	**137.32**	**280.23**	**10.36**	**58.61**	**68.97**	**14.56**	**126.13**	**140.69**	**489.89**

Notes: Yes indicates that the miles occur on large business holdings. No indicates that miles occur on small business holdings. New Code 1 indicates water type S and F. New Code 2 indicates water type N, perennial stream. New Code 3 indicates water type N, seasonal stream.

Table A3. Water type miles for eastern Washington

Water Body and Stream Miles

Eastern Washington		New Code 1		1 Total	New Code 2		2 Total	New Code 3		3 Total	Grand Total
WATER_TYPE	**CNTY**	**YES**	**NO**		**YES**	**NO**		**YES**	**NO**		
1	CHELAN		0.64	**0.64**							**0.64**
	FERRY		0.62	**0.62**							**0.62**
	KITTITAS		0.82	**0.82**							**0.82**
	OKANOGAN		5.57	**5.57**							**5.57**
	SPOKANE		3.63	**3.63**							**3.63**
	STEVENS		10.46	**10.46**							**10.46**
1 Total			**21.73**	**21.73**							**21.73**
2	KLICKITAT		2.53	**2.53**							**2.53**
	OKANOGAN		1.98	**1.98**							**1.98**
	SPOKANE		0.18	**0.18**							**0.18**
	STEVENS	0.04	6.03	**6.07**							**6.07**
2 Total		**0.04**	**10.71**	**10.76**							**10.76**
3	CHELAN		0.33	**0.33**							**0.33**
	FERRY	1.14	0.06	**1.20**							**1.20**
	GARFIELD		1.22	**1.22**							**1.22**
	KITTITAS	1.28	0.36	**1.64**							**1.64**
	KLICKITAT	1.40		**1.40**							**1.40**
	OKANOGAN		3.66	**3.66**							**3.66**
	PEND OREILLE		0.19	**0.19**							**0.19**
	SPOKANE		1.71	**1.71**							**1.71**
	STEVENS	1.25	2.85	**4.10**							**4.10**
3 Total		**5.06**	**10.38**	**15.44**							**15.44**
4	CHELAN	1.03	2.98	**4.01**							**4.01**
	COLUMBIA		1.03	**1.03**							**1.03**
	FERRY							0.27		**0.27**	**0.27**
	KITTITAS				0.22	0.80	**1.02**				**1.02**
	KLICKITAT	0.60	5.81	**6.41**		0.36	**0.36**				**6.77**
	OKANOGAN		3.69	**3.69**		1.22	**1.22**		0.21	**0.21**	**5.11**
	PEND OREILLE		4.00	**4.00**							**4.00**
	SPOKANE		2.49	**2.49**							**2.49**
	STEVENS	0.97	9.11	**10.08**	0.05	0.73	**0.78**		0.91	**0.91**	**11.77**
4 Total		**2.60**	**29.11**	**31.71**	**0.27**	**3.11**	**3.38**	**0.27**	**1.12**	**1.38**	**36.47**
5	CHELAN	0.76	2.03	**2.79**	2.65	1.15	**3.81**	7.60	9.58	**17.18**	**23.78**
	COLUMBIA	0.30	1.55	**1.85**		0.44	**0.44**				**2.29**
	FERRY	0.04	0.04	**0.07**	0.24		**0.24**	2.55		**2.55**	**2.87**
	GARFIELD		0.51	**0.51**		0.88	**0.88**		0.59	**0.59**	**1.98**
	KITTITAS	0.12	1.06	**1.17**	0.82	0.24	**1.06**	1.40		**1.40**	**3.63**
	KLICKITAT	0.55	7.57	**8.12**		0.58	**0.58**		0.03	**0.03**	**8.74**
	LINCOLN		0.49	**0.49**							**0.49**
	OKANOGAN		6.73	**6.73**		7.35	**7.35**		1.15	**1.15**	**15.23**
	PEND OREILLE		4.53	**4.53**		1.57	**1.57**		2.77	**2.77**	**8.87**
	SPOKANE		3.52	**3.52**		0.14	**0.14**				**3.66**
	STEVENS	3.57	8.31	**11.88**	2.08	4.69	**6.77**	0.94	3.65	**4.59**	**23.23**
5 Total		**5.34**	**36.32**	**41.67**	**5.79**	**17.05**	**22.84**	**12.49**	**17.77**	**30.26**	**94.77**
Grand Total		**13.05**	**108.26**	**121.31**	**6.06**	**20.16**	**26.22**	**12.76**	**18.88**	**31.64**	**179.17**